iSBC 640™
POWER SUPPLY
HARDWARE REFERENCE MANUAL

Order Number: 9800803-03

intel®

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Intel Corporation, 3065 Bowers Avenue, Santa Clara, California 95051

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PREFACE

This manual provides general information, installation information, and service information for the iSBC 640 Power Supply.

The schematic diagrams, parts layout diagrams, and parts information included in the manual are provided by Power One, Inc., with their permission.

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CHAPTER 1
GENERAL INFORMATION

1-1. INTRODUCTION

The iSBC 640 Power Supply is designed to deliver dc voltage levels to Intel products using iSBC and iCS modules. The supply provides sufficient power for a fully-loaded Intel Single Board Computer and up to 11 other expansion modules such as memory, I/O, disc control or other expansion modules.

1-2. GENERAL DESCRIPTION

The power supply provides regulated dc voltage at +12, -12, +5, and -5 volt levels from 100, 115, 215, or 230 Vac power sources. A 4-pin connector (P2) connects to the ac input power. The dc output power is accessible on keyed connectors (P6 and P8) that mate directly with the iSBC 604/614 Cardcage Assemblies. All outputs have current limiting and overvoltage protection capabilities. Special logic allows sensing for power failure and generates a TTL-level signal for orderly system power-down control. Figure 1-1 shows an iSBC 640 Power Supply.

1-3. POWER SUPPLY VERSIONS

Three versions of the iSBC 640 Power Supply are currently available. They are CP 216-1 (figure 1-1), CP 216A (figure 1-2) and 6005 (figure 1-3). The version number is printed on the power supply faceplate.

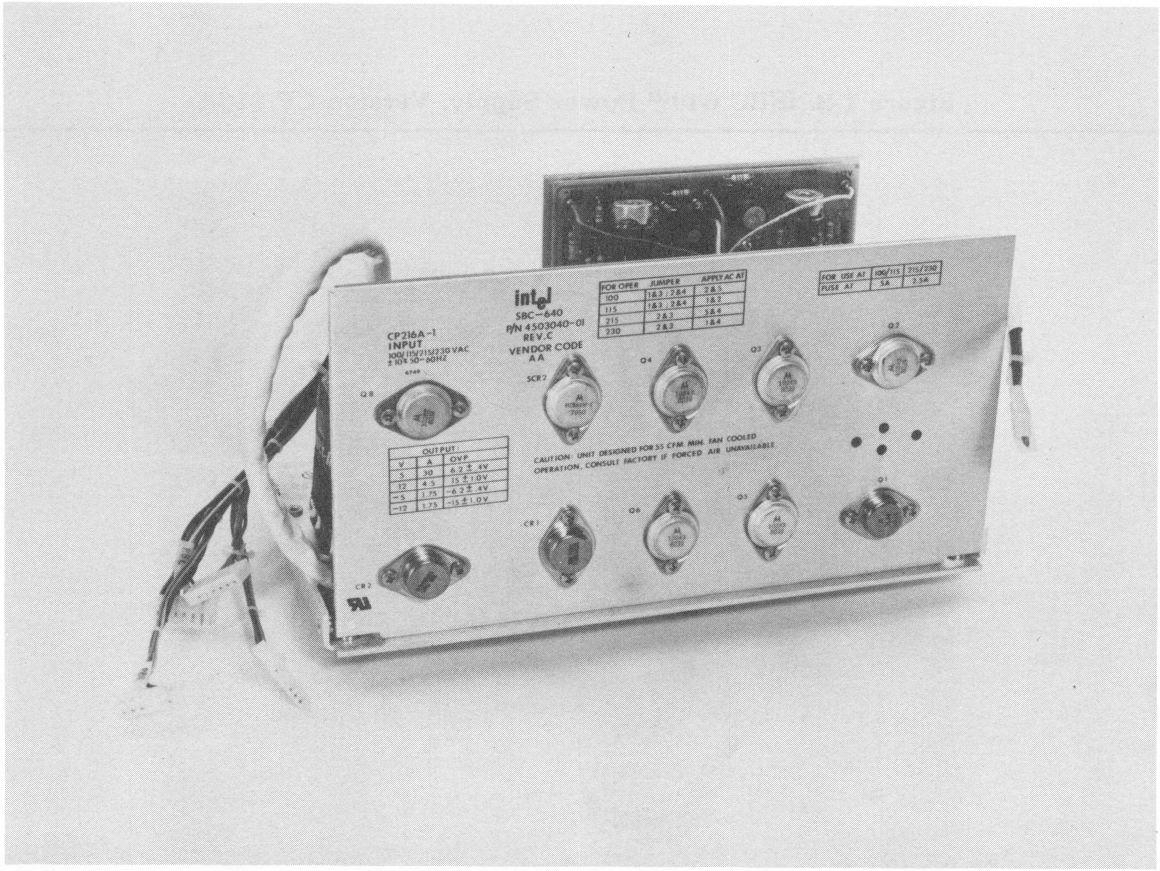

Figure 1-1. iSBC 640™ Power Supply, Version CP 216-1

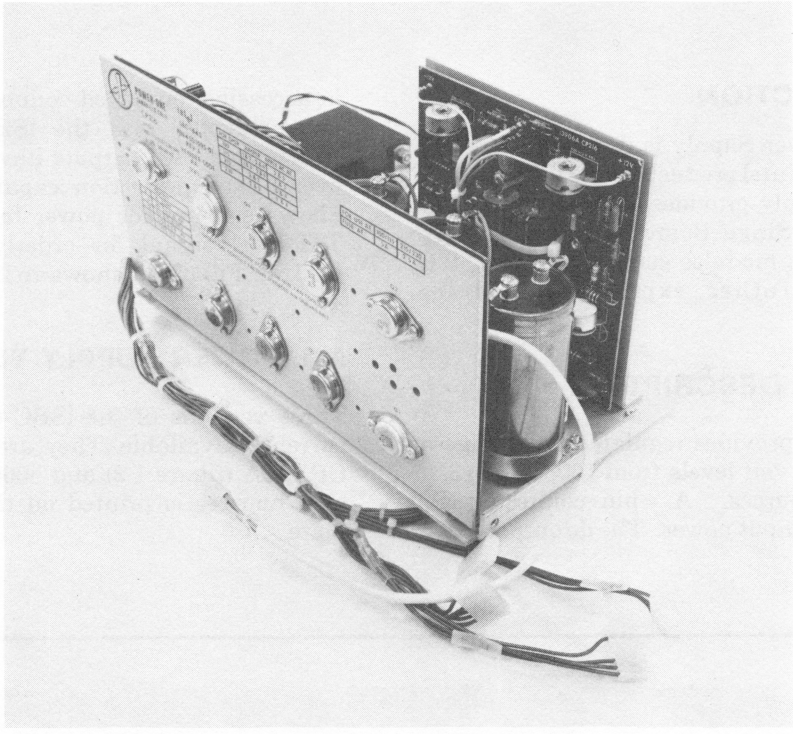

Figure 1-2. iSBC 640™ Power Supply, Version CP 216A

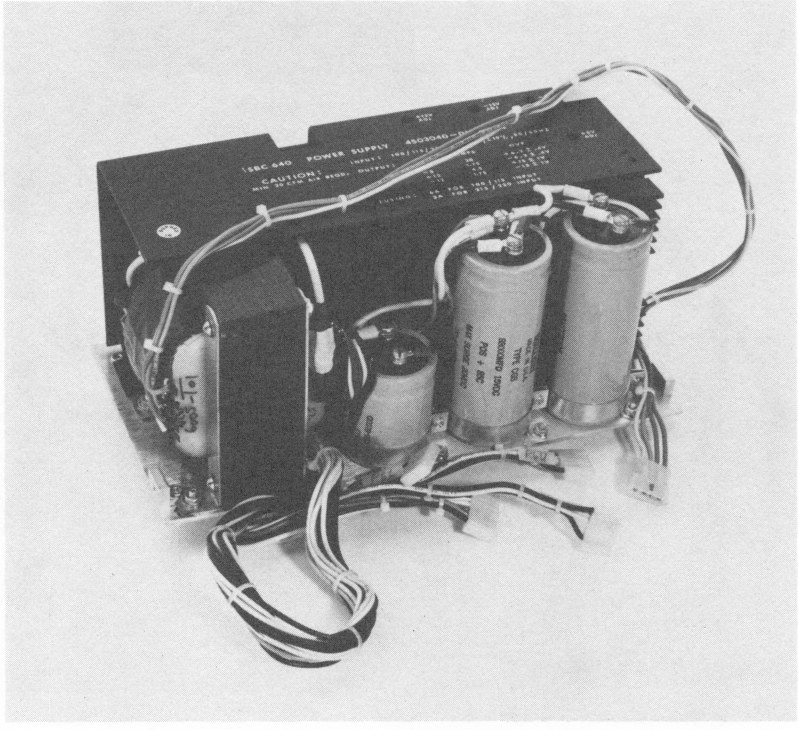

Figure 1-3. iSBC 640™ Power Supply, Version 6005

1-4. COMPATIBLE EQUIPMENT

The iSBC 640 Power Supply is designed for use with the Intel Single Board Computer product line. A system that includes an iSBC 635 Power Supply will readily upgrade to an iSBC 640 Power Supply for applications requiring greater current output capacity.

1-5. SPECIFICATIONS

Table 1-1 contains the electrical, physical, and environmental specifications for the iSBC 640 Power Supply.

Table 1-1. Specifications

Electrical Characteristics			
Input Frequency	47-63 Hz		
Input Voltage	100, 115, 215, or 230 Vac ±10%		
Power Efficiency	30% Minimum		
Output Power Rating	**Nominal Voltage**	**Rated Output Current (Max)**	**Over-Voltage Protection**
	+12	4.5 amp	+14 to +16 volts
	+5	30.0 amp	+5.8 to +6.6 volts
	-5	1.75 amp	-5.8 to -6.6 volts
	-12	1.75 amp	-14 to -16 volts
Output Current Protection	**Nominal Voltage**	**Current Foldback Range**	**Short Circuit Output Limit (Max)**
	+12	4.7 — 6.8 amp	2.3 amp
	+5	31.5 — 45.0 amp	15 amp
	-5	1.8 — 3.2 amp	0.9 amp
	-12	1.8 — 3.2 amp	0.9 amp
Remote Sensing	Provided for +5Vdc only		
Combined Line/Load Regulation	±1.0% for a ±50% load change and ±10% line change as measured at the output connector (±0.2% as measured at the power supply).		
Output Line Regulations	±0.1% for a ±10% static line change		
Output Ripple and Noise	10 mv peak-to-peak or 3 mv RMS maximum (dc to 500kHz)		
Output Transient Response	Less than 50 μsec for ±50% load change		
Output Transient Deviation	Less than ±10% of initial voltage for ±50% step load change		
Power Failure Indication	A TTL open collector high signal is provided when the input voltage drops below 90% of its nominal value. See paragraph 2-11.		
Output Voltage Hold Time (@ 95% of nominal value)	3.0 milliseconds minimum after AC Low true		
Output Voltage Set-up Time (from regulated output)	1.0 milliseconds minimum prior to AC Low false		
AC Low Signal Characteristics	Signal Low: 0 to 0.4V maximum @ -16mA Signal High: open collector TTL		
Physical Characteristics			
Height:	20.72 cm	(8.16 in)	Maximum
Width:	16.84 cm	(6.63 in)	Maximum
Depth:	32.05 cm	(12.62 in)	Maximum
Weight:	13.6 kg	(30.0 lbs)	Maximum

Table 1-1. Specifications (Continued)

Environmental Characteristics	
Operating Temperature	0° to 55°C (32° to 152°F) with 55 CFM air
Non-operating Temperature	-40° to 85°C (-40° to 185°F)
Humidity	Up to 90%, non-condensing
Output Stability	±0.05% of initial voltage for eight hours after 30 minute warmup
Output Temperature Coefficient	±0.03% per degree centigrade maximum from initial voltage
UL Recognition	
	U/L Recognition procedures for version 6005 are under way, but have not yet been completed. If U/L Recognition is of major importance in your program, please write to OMS Product Management at the above address, or call us at 503/640-7135 to determine the current status of the U/L recognition process.

CHAPTER 2
PREPARATION FOR USE

2-1. INTRODUCTION

The iSBC 640 Power Supply provides the appropriate voltage levels for an Intel Single Board Computer and up to 11 iSBC family expansion boards, depending on the current requirements of the boards. This chapter describes the installation and configuration procedures for the iSBC 640 Power Supply.

2-2. UNPACKING AND INSPECTION

Inspect the shipping carton immediately upon receipt for evidence of mishandling during transit. If the shipping carton is severely damaged or water-stained, request that the carrier's agent be present when the carton is opened. If the carrier's agent is not present when the carton is opened and the contents of the carton are damaged, keep the carton and packing material for the agent's inspection.

For repairs to a product damaged in shipment, contact the Intel MCSD Technical Support Center (see paragraph 3-2) to obtain a Repair Authorization Number and further instructions. A purchase order will be required to complete the repair. A copy of the purchase order whould be submitted to the carrier with your claim.

It is suggested that salvageable shipping cartons and packing material be saved for future use in the event the product must be shipped.

2-3. INSTALLATION CONSIDERATIONS

The supply is designed to be installed in an iSBC 660 System Chassis, in an iCS 80 System Chassis, or in a user-supplied mounting fixture. Select a mounting location that provides as much protection as possible from accidental physical or electrical contact with internal components of the iSBC 640 Power Supply.

The supply requires 55 cfm of air for cooling during operation. When other heat-producing components are mounted nearby, 55 cfm may not provide sufficient cooling. Any air-circulating system must meet the cooling needs of the supply and those of any other heat-producing components mounted within the same enclosure.

2-4. MOUNTING

Figure 2-1 provides the dimensions of the iSBC 640 chassis mounting plate. Any user-supplied mounting fixture must have mounting holes aligned with these

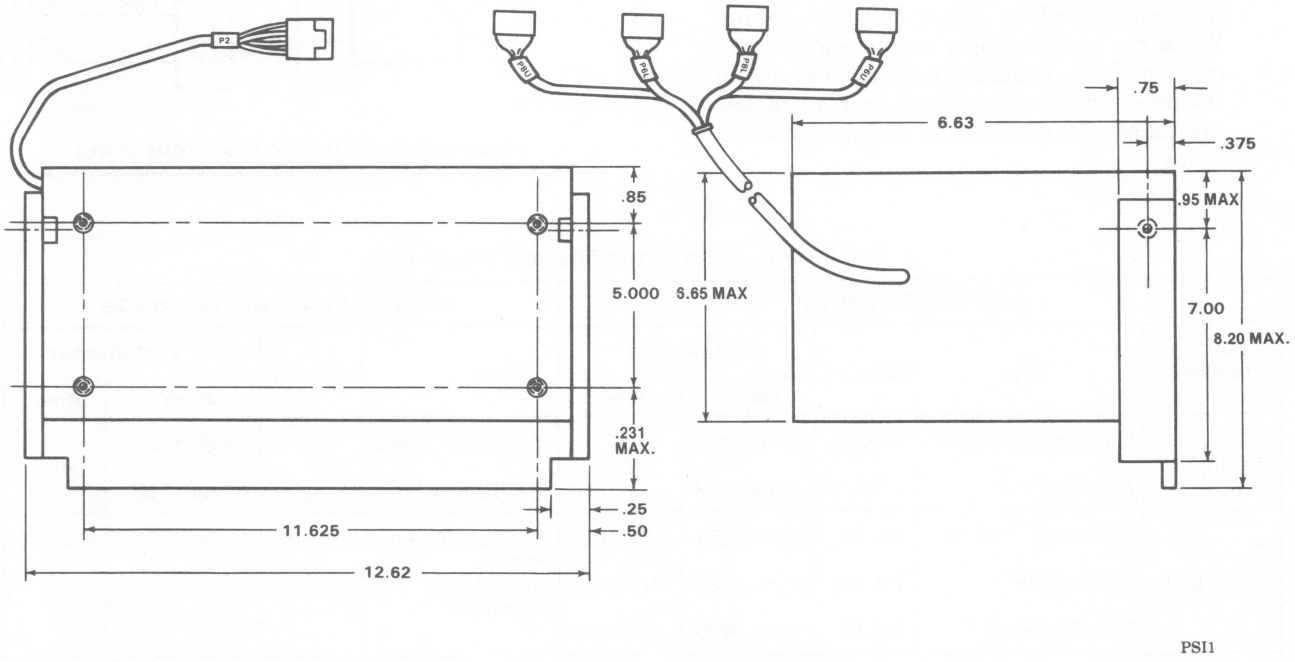

Figure 2-1. iSBC 640™ Power Supply Mounting Dimensions (Inches)

dimensions. Four user-supplied ⅜ inch screws are required to secure the supply to its mounting fixture. The length of these screws will vary with the application; one-quarter inch screws are recommended as a minimum length. The supply may be mounted vertically or horizontally, as required by the application.

2-5. INPUT POWER CONNECTOR WIRING

The supply is capable of operation from 100, 115, 215, or 230 volt ac sources. These voltages enter the power supply through P2, a factory-supplied female connector. The user must supply the appropriate male mating connector for the ac input source lines. Table 2-1 provides a list of appropriate connectors, their part numbers, and their manufacturers. By changing the wiring of the power supply transformer and/or the input power connectors, ac sources of 100, 115, 215, or 230 volts may be used. The following paragraphs describe each configuration.

NOTE

Examine the input power connector, 4-pin connector P2. Since P2 is a *female* connector with *male* pins, a *male* connector with *female* pins must be supplied by the user.

WARNING

Ensure that the power supply chassis is properly grounded when the application does not include a system chassis ground. When the power supply must be grounded, connect the ac ground wire (the green one in the power cord) to the power supply chassis, preferably at one of the mounting screw holes.

2-6. 115 VAC SOURCE WIRING

Figure 2-2 shows the configuration for normal use with 115 Vac power. Connect one ac input lead to pins 1 and 3 of the user-supplied connector J2 and connect the other input lead to pins 2 and 4. Ensure that the transformer connections are as shown.

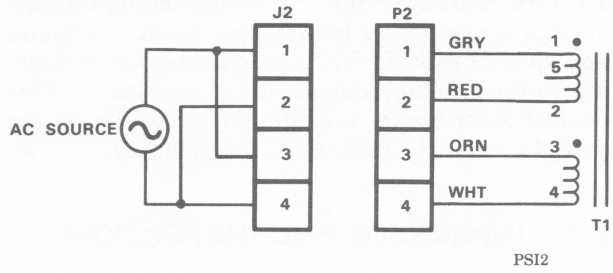

Figure 2-2. 115 Vac Configuration

2-7. 230 VAC WIRING

Figure 2-3 shows the transformer wiring required for using the iSBC 640 Power Supply with a 230 Vac source. Connect one ac input lead to pin 1 of the user-supplied connector J2, connect the other lead to pin 4, and connect pin 2 to pin 3. Ensure that the transformer connections are as shown.

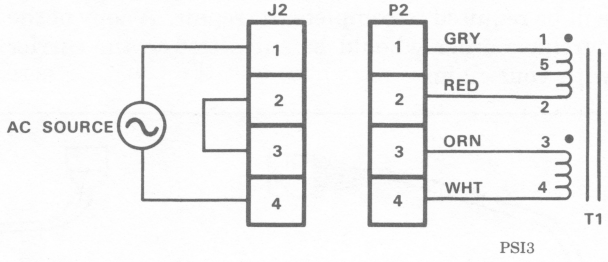

Figure 2-3. 230 Vac Configuration

Table 2-1. Connector Mating Parts List

CONNECTOR PARTS					RECOMMENDED MATING PARTS			
Function	Type	Use On	Part Number		Type	Use On	Part Number	
			Molex	Amp			Molex	Amp
AC Input	Connector, Female	P2	03-09-2042	N/A	Connector, Male	J2	03-09-1042	N/A
	Pin, Male	P2	02-09-2118		Pin, Female	J2	02-09-1118	
DC Output	Connector, Female	P6, P8	26-03-3071	3-87025-3	Connector, Male Wafer Right Angle Assembly	J6, J8	09-66-1071	87194-6
	Pin, Female	P6, P8	08-50-0187	87023-1				
	Key, Polarizing	P6, P8	15-04-9209	87116-2				

NOTE: Parts from each recommended vendor must be used as a set.

2-8. 215 VAC WIRING

To operate the power supply from a 215 Vac source, it is necessary to modify both the connector wiring and the transformer tap wiring. The connector wiring is identical to the 230 Vac hook-up. However, the GRAY wire connected to tap 1 on the input side of the transformer must be desoldered and soldered to tap 5 (see figure 2-4).

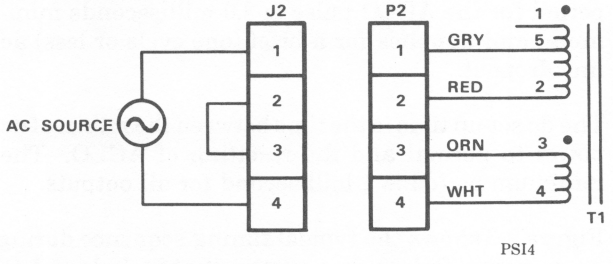

Figure 2-4. 215 Vac Configuration

2-9. 100 VAC WIRING

To operate the power supply from a 100 Vac source, it is necessary to modify both the connector wiring and the transformer tap wiring. Figure 2-5 illustrates the correct wiring. Notice that in the 100 Vac configuration, only three of the input wires are connected to the input taps of the transformer: GRAY to tap 5, RED to tap 2, and WHITE to tap 4. The ORANGE wire should be bent back and taped to the wire bunch. To complete the 100 Vac wiring, a 20 AWG jumper must be installed between taps 1 and 3.

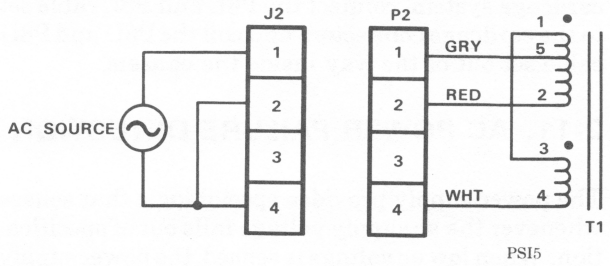

Figure 2-5. 100 Vac Configuration

2-10. OUTPUT POWER CONNECTIONS

The iSBC 640 Power Supply includes four output power connectors; P6U, P8U, P6L, and P8L. Connectors P6U and P6L provide +5 volts, -12 volts, and ground. Connectors P8U and P8L provide +5 volts, -5 volts, +12 volts, and ground. Pin assignments for each connector are shown in table 2-2. The "U" cable set (P6U and P8U) is mechanically interchangeable with the "L" cable set (P6L and P8L); the only difference being the extra 3 inches in length of the "U" cable set. The connectors are designed to plug directly onto the iSBC 604/614 backplane. Connector P8 is keyed to mate with J8 on the backplane and connector P6 is keyed to mate with J6.

NOTE

When connecting an iSBC 640 Power Supply, keep the cable sets together; use P6U and P8U as a set and P6L and P8L as a set.

Table 2-2. Connector Wiring

Connector Pin	P2 Wire Color	P2 Function	P6L Function	P8L Function	P6U Function	P8U Function
1	GRY	TO T1-1 OR T1-5	GND	KEY	GND	KEY
2	RED	TO T1-2	+5Vdc	GND	+5Vdc	GND
3	ORN	TO T1-3	+5Vdc	-5Vdc	+5Vdc	——
4	WHI	TO T1-4	-12Vdc	+12Vdc	——	——
5	——	TO T1-5	——	+5Vdc	——	+5Vdc
6	——	——	GND	+5Vdc +5V SENSE	GND	+5Vdc
7	——	——	KEY	GND +5V SENSE	KEY	GND

When using the iSBC 640 Power Supply with a one cardcage system, connect the P6L and P8L cable set to the cardcage connectors and coil the P6U and P8U cable set out of the way inside the chassis.

2-11. AC POWER FAILURE DETECTION

The power supply provides special logic that senses whenever the ac supply voltage falls out of specification. When low ac voltage is sensed, the power supply generates a TTL-level signal (ACLO) as an indication.

When operating at full load output and with 115 Vac (230 Vac) 60Hz nominal line conditions, the power supply is pre-adjusted to set the ACLO signal whenever the ac input voltage drops below 90% of the nominal (115 or 230 Vac). The power supply is also pre-adjusted to reset the ACLO signal whenever the ac input voltage rises above 92.5% of the nominal. These set and reset thresholds will remain within approximately ±1.5% tolerance over a 0° to 55°C temperature range and over a 57 to 63Hz frequency range at full load.

The ACLO signal originates from an open collector device. However, before using ACLO, you must terminate the signal to an external +5V power source through a 1K ohm pull-up resistor. The ACLO signal is accessible at a test point labeled "PWR FAIL" on the 12V Printed Circuit Board within the power supply.

Figure 2-6 shows the ACLO sequence and the important specifications of the ACLO pulse, including the dc hold time, the ACLO pulse width, and the dc set-up time.

The dc hold time is the period measured from the setting of ACLO to the dropping of the dc voltage to 95% of its nominal dc voltage. On the iSBC 640 Power Supply, the dc hold time is 3.0 milliseconds minimum for all output voltages, and typically around 7.5 milliseconds. This applies for a complete ac line dropout if the initial ac line voltage was within the specifications listed in table 1-1.

The ACLO pulse width is the period measured from the setting of ACLO to the resetting of ACLO. The period for the ACLO pulse is 3.0 milliseconds minimum, and appplies for a brief (one cycle or less) ac line dropout.

The dc set-up time is the time between the return of dc power to normal and the resetting of ACLO. The minimum period is 1 millisecond for all outputs.

Figure 2-6 shows the typical timing sequence during an ac power failure on a system that includes a battery back-up power option. The ACLO signal may be used to generate a Power Failure Interrupt for the CPU, to alert the memory protect logic, and to disable subsequent read/write operations. ACLO may also set a Power Failure Detect flag to indicate that a power failure has occurred. However, note that some user wiring and logic design is required to generate power failure detect, memory protect, and power failure interrupt signals from the ACLO signal.

2-12. AC POWER FAILURE CONNECTION

The ac low signal (ACLO) is available as "PWR FAIL" on the 12V Printed Circuit Board in the iSBC 640 Power Supply. A 20 gauge (or larger) wire must be soldered to the ACLO test point and should be as short as possible to avoid voltage ringing on the ACLO line.

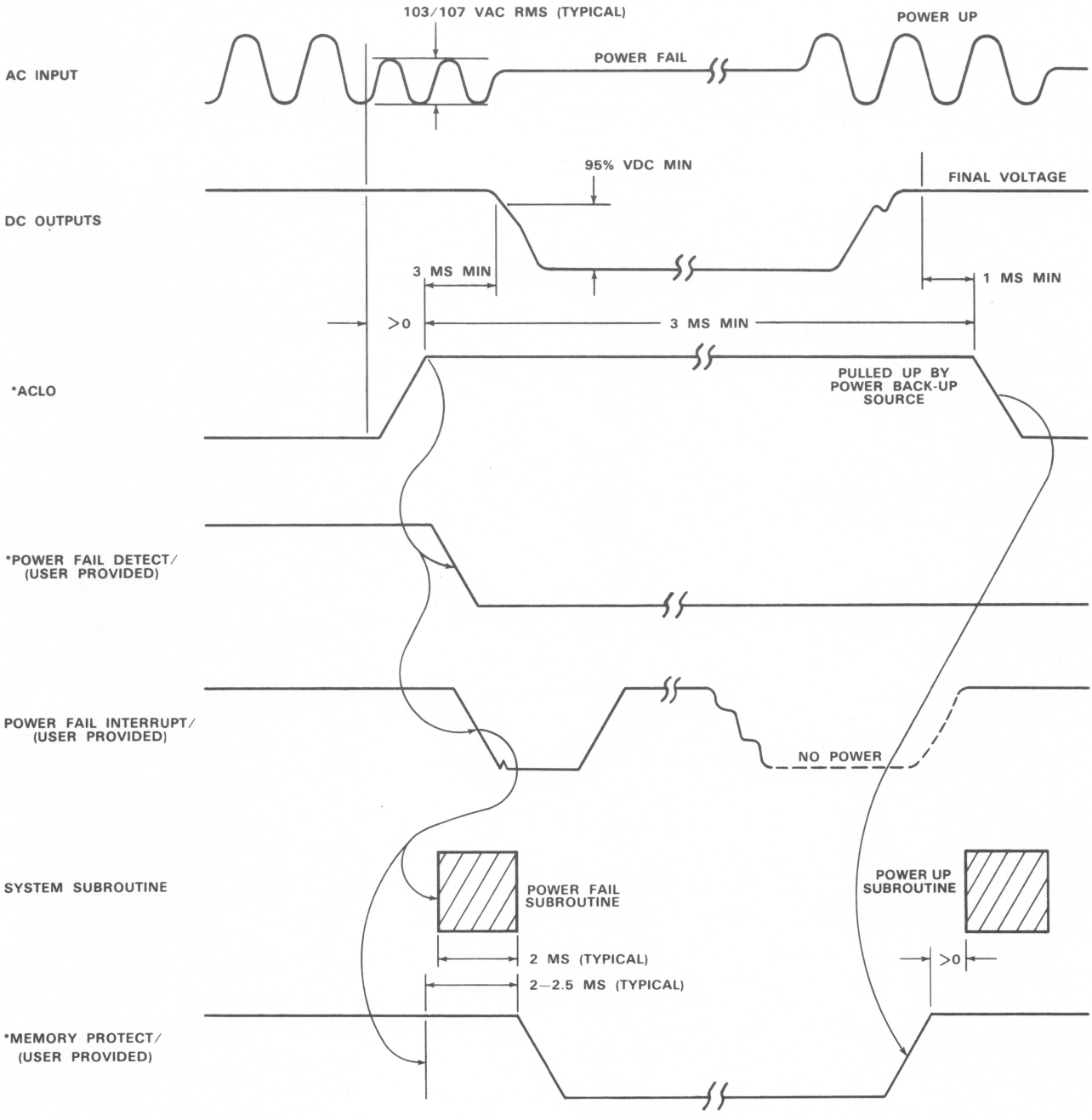

Figure 2-6. Power Fail Timing Sequence

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CHAPTER 3
SERVICE INFORMATION

3-1. INTRODUCTION

This chapter provides service and repair information for the iSBC 640 Power Supply, Models CP 216-1, CP 216A and 6005. Included is a list of replacement parts, schematic diagrams, voltage adjustment procedures and other calibration procedures.

3-2. SERVICE AND REPAIR ASSISTANCE

United States Customers can obtain service and repair assistance by contacting the Intel Repair Center in Phoenix, Arizona via the Product Service Hotline. Customers outside the United States should contact their sales source (Intel Sales Office or Authorized Distributor) for service information and repair assistance.

Before calling the Product Service Hotline, you should have the following information available:

a. Date you received the product.

b. Complete part number of the product (including dash number). On boards, this number is usually silk-screened onto the board. On other Intel products, it is usually stamped on a label.

c. Serial number of product. On boards, this number is usually stamped on the boards. On other Intel products, the serial number is usually stamped on a label.

d. Shipping and billing addresses.

e. If your Intel product warranty has expired, you must provide a purchase order number for billing purposes.

f. If you have an extended warranty agreement, be sure to advise the Hotline personnel of this agreement.

Use the following numbers for contacting the Intel Product Service Hotline.

TELEPHONE:

All U.S. locations, except Alaska, Arizona & Hawaii:

(800) 528-0595

All other locations:

(602) 869-4600

TWX NUMBER:

910 - 951-1330

Always contact the Product Service Hotline before returning a product to Intel for repair. You will be given a repair authorization number, shipping instructions, and other important information which will help Intel provide you with fast, efficient service. If you are returning the product because of damage sustained during shipment or if the product is out of warranty, a purchase order is required before Intel can initiate the repair.

In preparing the product for shipment to the Repair Center, use the original factory packing material, if possible. If this material is not available, wrap the product in a cushioning material such as Air Cap TH-240, manufactured by the Sealed Air Corporation, Hawthorne, N.J. Then enclose it in a heavy duty corrugated shipping carton, and label "FRAGILE" to ensure careful handling. Ship only to the address specified by Product Service Hotline personnel.

3-3. DC OUTPUT VOLTAGE ADJUSTMENTS

All dc voltages supplied by the iSBC 640 Power Supply may be adjusted over a wide range. The output voltage levels should be adjusted whenever a deviation of more than ±5% from the nominal value is found, or whenever an overvoltage protection failure occurs.

Several trimmer potentiometers are mounted onto the printed circuit boards within the power supply. To adjust a dc output voltage, determine from table 3-1 which of the potentiometers must be adjusted. Each potentiometer is also labeled on the power supply printed circuit boards for positive identification.

CAUTION

Voltage adjustments should be performed with extreme care. Use only non-conductive tools when adjusting the output potentiometers.

The voltage adjustment procedure for the +5, -5, +12, and -12 volt outputs is as follows:

1. Check the ac voltage level at the P2 connector or transformer; ensure that it is within 10% of the nominal value.
2. Remove power from the unit by unplugging the ac power cord.

Table 3-1. Output Voltage Adjustment Information

Supply	Multibus Pin Numbers		Nominal Range	Resistor No. and Rotation Direction To Increase Positive	
	Signal	Ground		Model CP 216-1 & CP 216A	6005
+5	3 or 4	1 or 2	+4.75 to +5.25	R14 Counterclockwise	R15 Clockwise
-5	9 or 10	1 or 2	-5.75 to -4.75	R35 Clockwise	R21 Clockwise
+12	7 or 8	1 or 2	+11.4 to +12.6	R26 Clockwise	R3 Clockwise
-12	79 or 80	85 or 86	-12.6 or -11.4	R42 Counterclockwise	R13 Clockwise

Note: All other pots are factory-set and are not user-adjustable.

3. If the power supply is connected to an iSBC 604/614 cardcage, remove all iSBC boards from the cardcage.
4. Using a high quality voltmeter, attach the meter leads to the Multibus pins listed for that voltage in table 3-1.
5. Plug the ac power cord into the socket and turn the ac power ON.
6. After the power supply has warmed up for at least 30 minutes, observe the voltage reading and adjust the potentiometer accordingly.

3-4. OVERVOLTAGE PROTECTION CIRCUIT RESET

The Overvoltage Protection circuitry and the Current Limiting circuitry are adjusted at the factory and are not user-adjustable. If the supply remains out of tolerances or consistantly malfunctions, refer to service procedures as detailed in the following text.

The four output supplies (+5, -5, +12, and -12) include individual overvoltage protection circuits that disable the supply when the voltage rises above a factory-set limit. Refer to the specifications in table 1-2 for a list of the overvoltage protection triggering levels.

To restore power after the overvoltage protection circuit has been activated, first remove power from the supply for at least three seconds. Refer to paragraph 3-3 for details on readjusting the output voltage. Table 3-1 provides the part number and proper direction of rotation for individual trimmer potentiometers. Rotate the appropriate potentiometer approximately one-half turn to decrease output voltage and then restore power. Observe the output voltage level with a voltmeter. If the overvoltage protection circuit is still activated, repeat the procedure. When a dc level is present, readjust the potentiometer to the proper voltage. If the proper output voltage level cannot be attained without triggering the overvoltage protection circuit, a circuit malfunction is indicated. The overvoltage protection circuit is not user-adjustable. Refer to paragraph 3-2 for factory service assistance.

NOTE

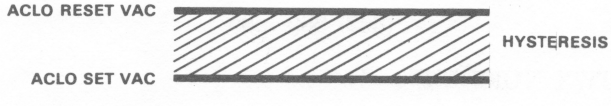
On the 6005 version of the power supply, an over-voltage condition on either the +12 Vdc or the -12 Vdc output will result in both voltages dropping to ϕ Vdc output until the power supply is reset.

3-5. ACLO THRESHOLD ADJUSTMENT

The ACLO threshold adjustment indicates the input ac RMS voltage at which the ACLO signal becomes active or inactive. When set (active), the ACLO signal is logic "1", denoting the detection of an ac power failure. When reset (inactive), the ACLO signal is logic "0", denoting the non-detection of an ac power failure.

As shipped from the factory, the ACLO signal from the iSBC 640 Power Supply operates at the thresholds specified in paragraph 2-11. These values will be altered if using a different input voltage, load, or frequency.

The set/reset threshold voltage levels are adjusted using potentiometers R2 and R11 for the CP 216-1 and CP 216A and potentiometers R31 and R33 for the 6005 power supply. The reset threshold should always be higher than the set threshold; the difference in threshold levels (hysteresis) prevents oscillation of ACLO. The adjustment procedure is listed in the following text.



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The equipment required to adjust the ACLO includes:

1. An autotransformer with variable frequency and voltage adjustment ability.
2. A digital voltmeter.
3. An oscilloscope.
4. A non-metal adjusting tool.

CP216-1 and CP216A Adjustment Procedures for the threshold levels are as follows:

1. Preadjust the autotransformer to the desired nominal ac RMS voltage and frequency (100/115/215/230 Vac ± 10% at 50/60 Hz ± 5%).
2. Connect the autotransformer output to the ac input of the CP 216-1 power supply and run the supply for approximately 15 minutes with no load to stabilize the outputs.
3. Shut off the power supply and connect the desired load. Restore power and connect the oscilloscope to the ACLO signal at the ACLO solder post.

   Connect the voltmeter across the ac input leads of the power supply to measure the ac RMS voltage.

NOTE

The ACLO signal should be pulled up via 1K resistor and an auxiliary +5V source (preferably a battery).

WARNING

Hazardous voltages are present inside the power supply. Avoid unnecessary contact with the components of the power supply, and remove all metal objects (rings, watches, etc.) from your hands before performing any adjustments.

4. Adjust the autotransformer voltage to the approximate ac input level at which the ACLO set threshold is desired.
5. Rotate R11 fully clockwise (CW) and R2 fully counterclockwise (CCW). Now the ACLO line should be at a stable TTL High (logical "1").
6. Rotate R2 slightly CW until the ACLO signal appears as a square wave. Fine adjust R2 CW or CCW to obtain a 50% duty cycle square wave.
7. Rotate R11 slightly CCW until the square wave becomes a stable TTL High (logical "1").
8. Repeat Steps 6 & 7 in small rotational increments, 8 or 9 times or until no square wave can be achieved by rotating R2 CW. At this point ACLO will alternate from a stable TTL High to a stable TTL Low with a slight movement of R11 CW and CCW.
9. The ACLO set and reset threshold levels should now be about equal. (A small amount of hysteresis may cause the voltages to vary.) Verify this by adjusting the ac input voltage with the autotransformer.
10. To adjust the ACLO reset threshold further above the set threshold, turn R11 slightly CCW. Verify the new location of the ACLO reset threshold by varying the ac input voltage with the autotransformer. The ACLO set threshold should remain the same.
11. Repeat Steps 10 as many times as is necessary to obtain the desired ACLO reset threshold.
12. After the ACLO set and reset thresholds have been set, it is possible to increase or decrease both threshold values simultaneously (over a small ac input voltage range) without altering the amount of hysteresis. Such an adjustment is made by turning R2 slightly CW (CCW) to decrease (increase) both thresholds.

NOTE

This adjustment is meant only for small changes in both set and reset threshold. Large change could alter the amount of hysteresis.

6005 Adjustment Procedure for the threshold voltage levels is as follows:

1. Preadjust the autotransformer to the desired nominal ac RMS voltage and frequency (100/115/215/230 Vac ± 10% at 50/60 Hz ± 5%).
2. Connect the autotransformer output to the ac input of the power supply and run the supply for approximately 15 minutes with no load to stabilize the outputs.
3. Shut off the power supply and connect the desired load. Restore power and connect the oscilloscope to the ACLO signal at the ACLO solder post.

   Connect the voltmeter across the ac input leads of the power supply to measure the ac RMS voltage.

NOTE

The ACLO signal should be pulled up via 1K resistor and an auxiliary +5V source (preferably a battery).

WARNING

Hazardous voltages are present inside the power supply. Avoid unnecessary contact with the components of the power supply, and remove all metal objects (rings, watches, etc.) from your hands before performing any adjustments.

4. Adjust the autotransformer voltage to the approximate ac input level at which the ACLO set threshold is desired.
5. Rotate R33 fully clockwise (CW) and R31 fully counterclockwise (CCW). Now the ACLO line should be at a stable TTL High (logical "1").
6. Rotate R31 slightly CW until the ACLO signal appears as a square wave. Fine adjust R31 CW or CCW to obtain a 50% duty cycle square wave.
7. Rotate R33 slightly CCW until the square wave becomes a stable TTL High (logical "1").
8. Repeat Steps 6 & 7 in small rotational increments, 8 or 9 times or until no square wave can be achieved by rotating R2 CW. At this point ACLO will alternate from a stable TTL High to a stable TTL Low with a slight movement of R11 CW and CCW.
9. The ACLO set and reset threshold levels should now be about equal. (A small amount of hysteresis may cause the voltages to vary.) Verify this by adjusting the ac input voltage with the autotransformer.
10. To adjust the ACLO reset threshold further above the set threshold, turn R11 slightly CCW. Verify the new location of the ACLO reset threshold by varying the ac input voltage with the autotransformer. The ACLO set threshold should remain the same.
11. Repeat Steps 10 as many times as is necessary to obtain the desired ACLO reset threshold.
12. After the ACLO set and reset thresholds have been set, it is possible to increase or decrease both threshold values simultaneously (over a small ac input voltage range) without altering the amount of hysteresis. Such an adjustment is made by turning R31 slightly CW (CCW) to decrease (increase) both thresholds.

NOTE

This adjustment is meant only for small changes in both set and reset threshold. Large change could alter the amount of hysteresis.

3-6. REPLACEMENT PARTS LISTING

There are three separate parts lists for the iSBC 640 Power Supply, Model CP 216-1 and CP 216A. The overall assembly parts are listed in figure 3-1. The parts for the 5V Printed Circuit Board are illustrated in figure 3-2 and listed in figure 3-3. The parts for the 12V Printed Circuit Board are illustrated in figure 3-4 and listed in figure 3-5.

All parts for the Model CP 216-1 and CP 216A power supplies are available from common commercial sources or from:

Power One, Incorporated
531 Dawson Drive
Camarillo, CA 93010

All parts for the Model 6005 power supply are available from common commercial sources or from:

Xentex, Inc.
270 South Pacific
San Mareno, CA 92069

3-7. SCHEMATIC DIAGRAMS

Figures 3-1, 3-2, 3-3, 3-4 and 3-5 show the schematic diagrams for the Model CP 216-1 and CP 216A power supplies.

Figures 3-6, 3-7, and 3-8 show the schematic diagrams for the Model 6005 power supply.

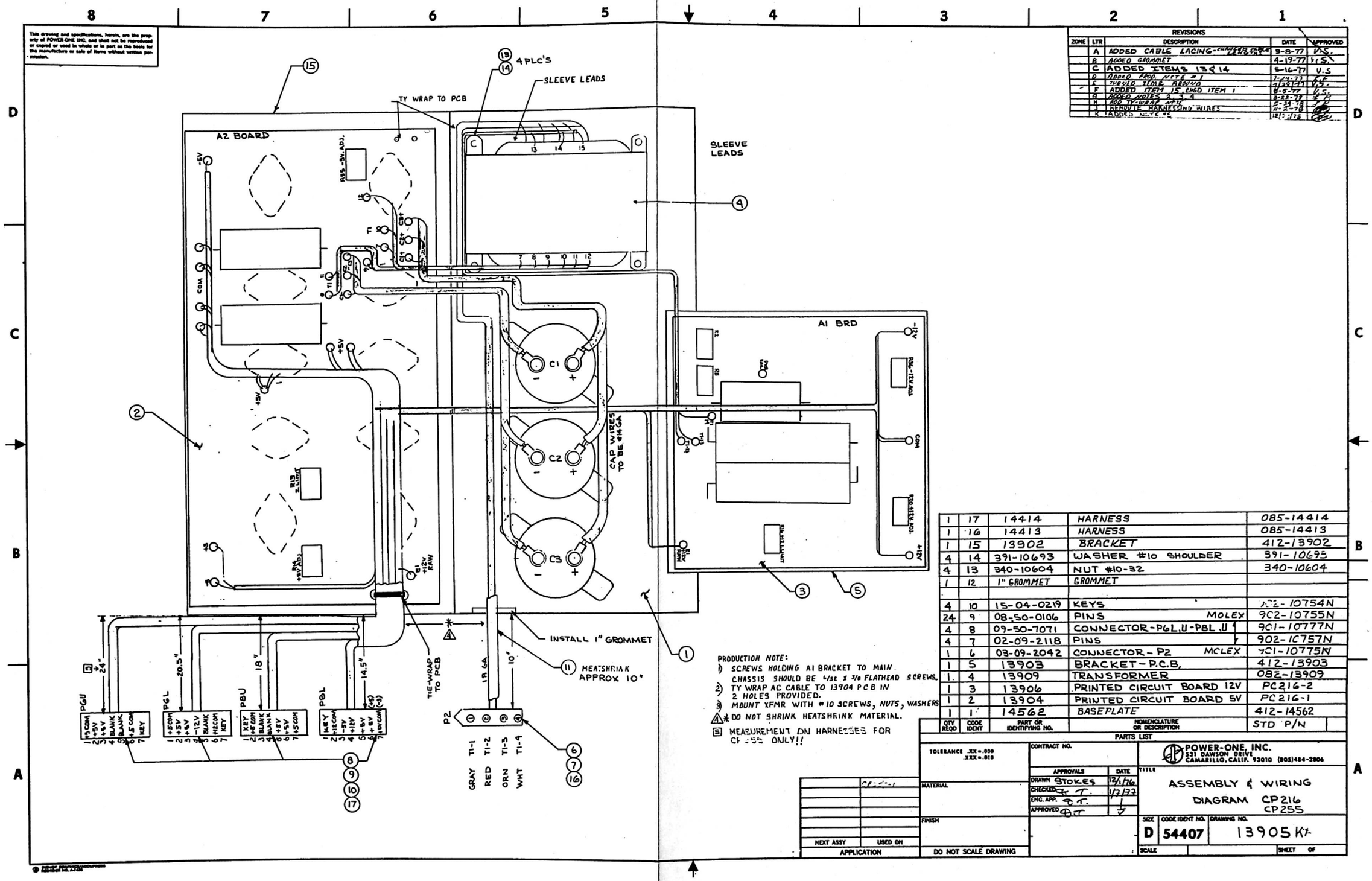


Figure 3-1. iSBC™ 640 Power Supply Assembly Diagram

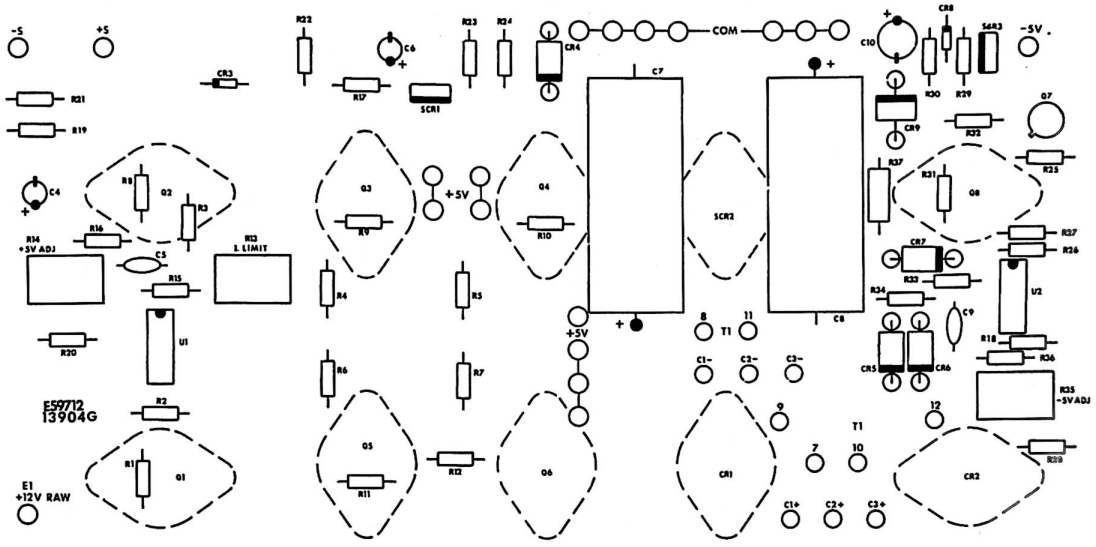


Figure 3-2. 5V Printed Circuit Board Assembly

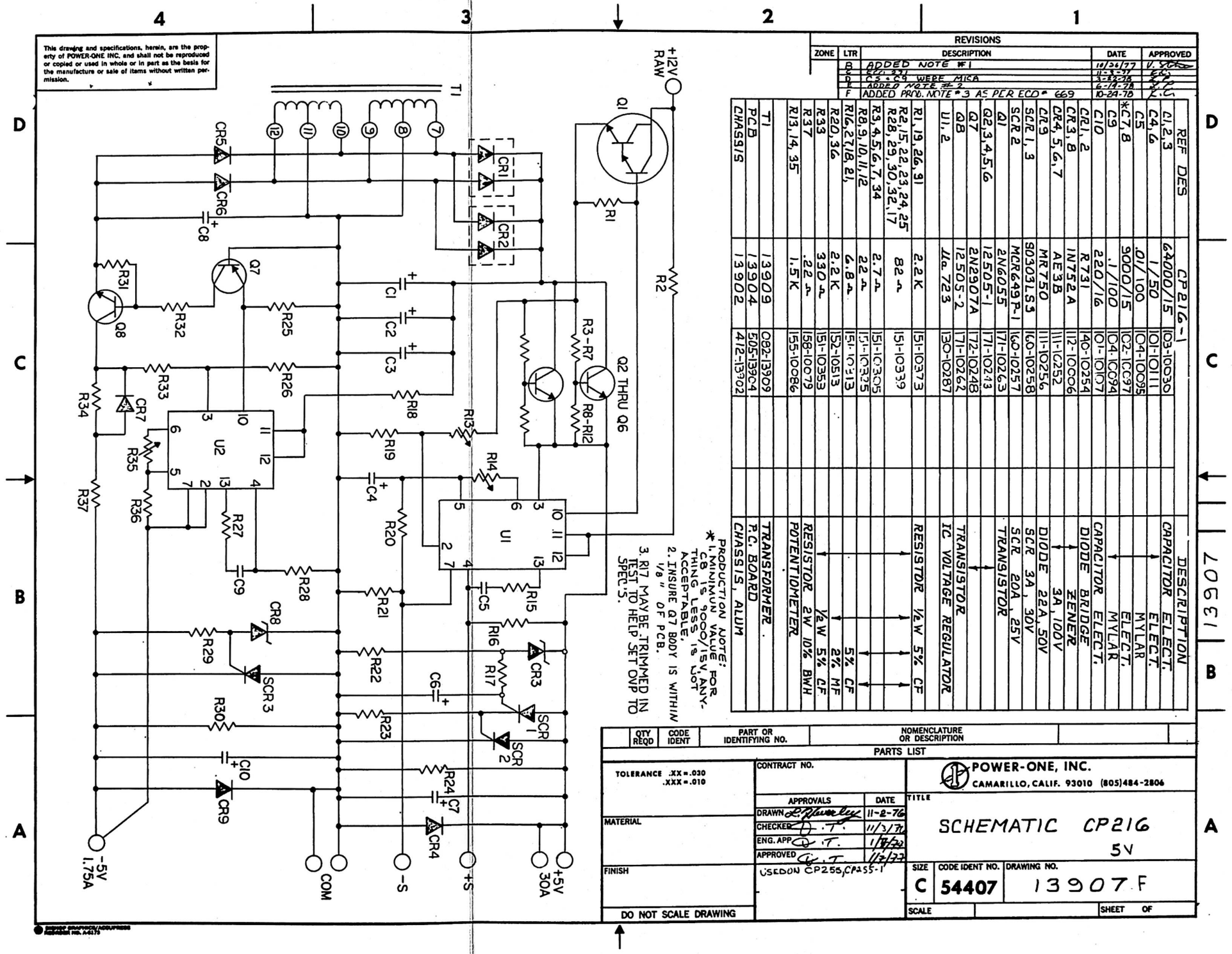


Figure 3-3. 5V Printed Circuit Board Schematic Diagram

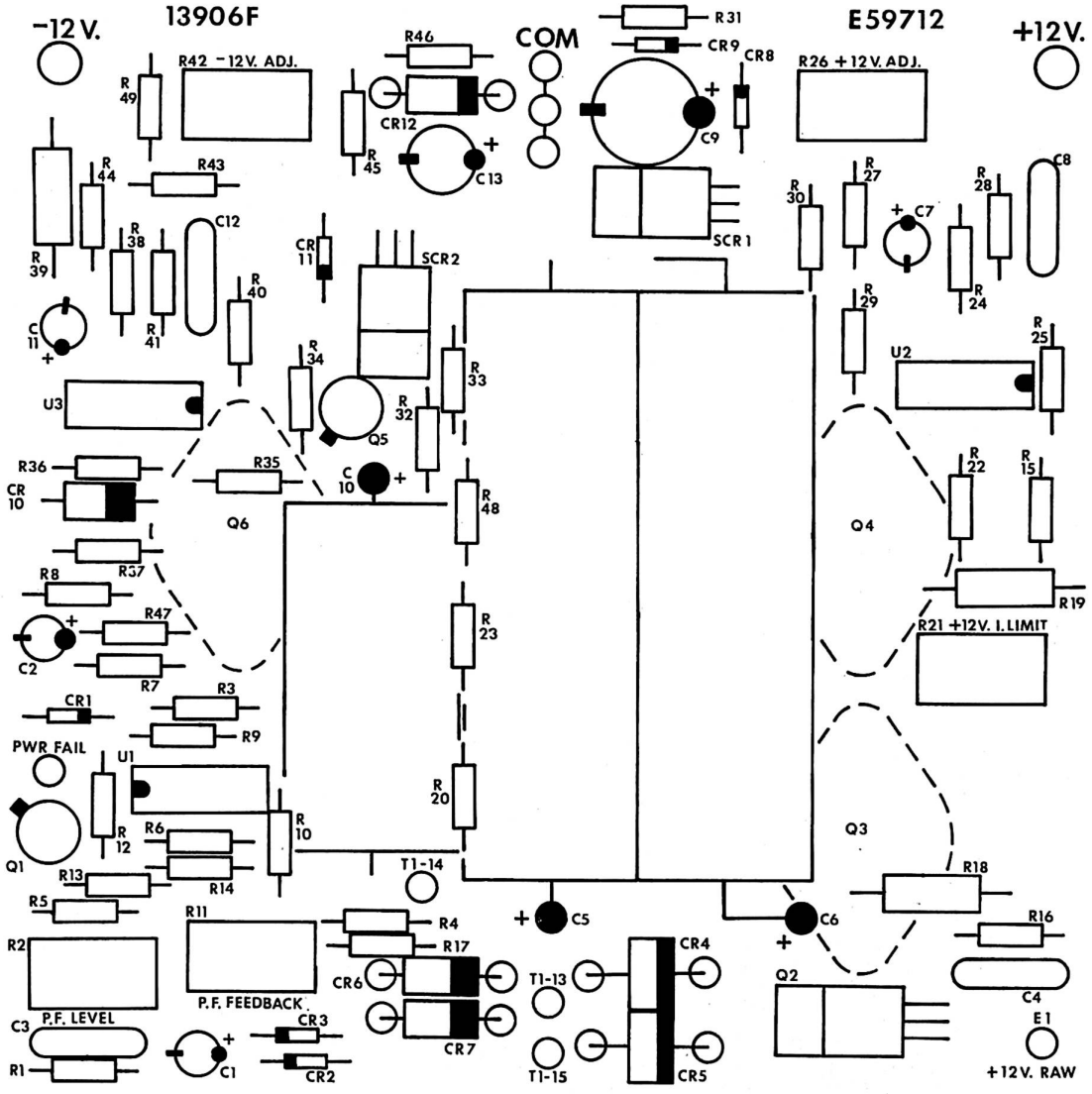
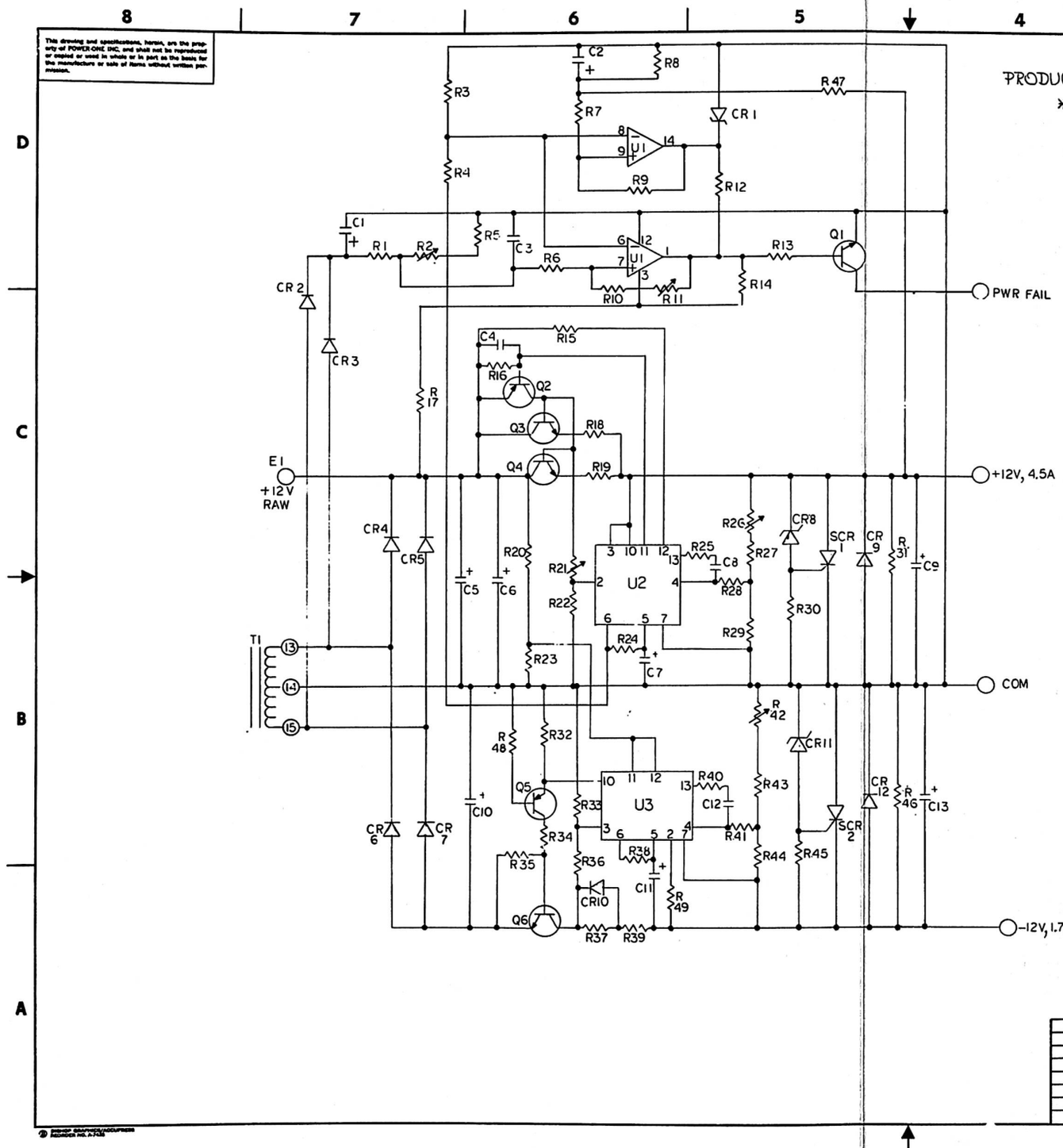


Figure 3-4. 12V Printed Circuit Board Assembly

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	E	REDRAWN, ECO 945 INCORPORATED	8-2-78	
	F	POWER FAIL CIRCUIT REVISED PER SCC-#509	6-12-78	
	6	R48 & 49 ADDED DURING REDESIGN OF P.F.	10-2-78	

PRODUCTION NOTES:

* 1) INSTALL 13920 THERMO HEATSINK
2 SET P.F. TO GO HIGH AT 101 VAC WITH +12V. AND +5V. FULLY LOADED



C 1,2,7,11	1/50	CAPACITOR ALUM ELECT	101-10111
C 5,6	7300/35		102-10098
C 9	330-35		101-10109
C 10	3300/35		102-10099
C 13	100/35	ALUM ELECT	101-10110
C 3,4,8	.01/100	MYLAR	104-10095
C 12	.0033/100	CAPACITOR MYLAR	104-10092
CR 2,3,9	AE1C	DIODE 1A 200V	111-10251
CR 4,5	MR750		111-10256
CR 6,7,10,12	AE3B	3A 100V	111-10252
CR 8,11	1N965B	ZENER	112-10009
CR 1	----	DIODE ZENER	----
* SCR	S0508LS3	SCR 8A	160-10013
SCR 2	S0303LS3	SCR 3A	160-10058
Q1	2N2219	TRANSISTOR	172-10247
* Q2	2N6554		172-10250
Q3, 4, 6	12505-2		171-10262
Q5	2N2907	TRANSISTOR	172-10248
R1	3.3K	RESISTOR ½W 5% CF	151-10377
R 22, 33, 35, 8	4.7K		151-10381
R 26, 41, 46, 23, 16, 31	2.2K		151-10373
R 5	330Ω		151-10353
R 38, 45, 20, 40, 17, 49	300Ω		151-10352
R 15, 24, 30, 32, 34, 36	300Ω		151-10352
R 7, 48	1K		151-10365
R 25, 6, 12	6.8Ω		151-10313
R 37	2.7Ω		151-10305
R 9	200K	5% CF	151-10420
R 13	4.7K	±2% MF	152-10521
R 3, 4	2.4K		152-10514
R 10	1K		152-10505
R 14, 47	10K		152-10529
R 29, 44	2.2K		152-10513
R 27, 43	1.2K	½W ±2% MF	152-10507
R 18, 19	.18Ω	2W BWH	158-10078
R 39	.22Ω	RESISTOR 2W BWH	158-10079
R 2, 11, 26, 21, 42	1.5K	POTENTIOMETER	155-10086
U1	LM3302N	I.C. VOLTAGE REGULATOR	130-10683
U2, 3	µa 723	I C VOLTAGE REGULATOR	130-10287
PCB	13906	PRINTE CIRCUIT BOARD	505-13906
T1	13909	TRANSFORMER	082-13909
BRACKET-PCB	13903	BRACKET	412-13903

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	STD P/N

PARTS LIST

CP255, CP255-1	
NEXT ASSY	USED ON
APPLICATION	

TOLERANCE .XX=.030 .XXX=.010
MATERIAL
FINISH
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN L. ADAMAN	3-1-78
CHECKED	3-2-78
ENG. APP.	
APPROVED	

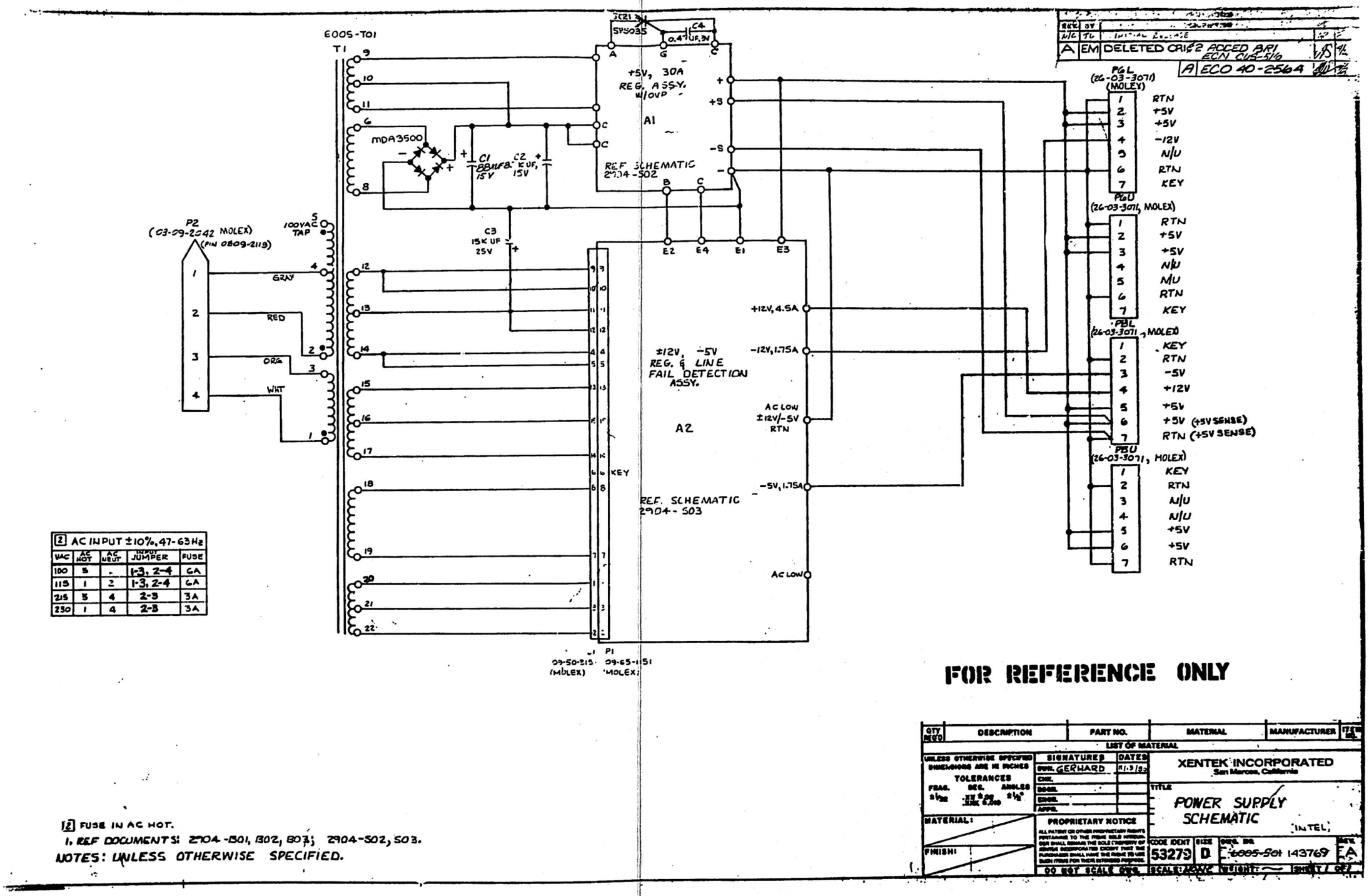
POWER-ONE, INC.
521 DAWSON DRIVE
CAMARILLO, CALIF. 93010 (805)484-2806

TITLE
SCHEMATIC
CP216 12V

SIZE	CODE IDENT NO.	DRAWING NO.
D	54407	13908G

SCALE — SHEET OF

Figure 3-5. 12V Printed Circuit Board Schematic Diagram



[2] AC INPUT ±10%, 47-63 Hz				
VAC	AC HOT	AC NEUT	INPUT JUMPER	FUSE
100	3	-	1-3, 2-4	6A
115	1	2	1-3, 2-4	6A
215	3	4	2-3	3A
230	1	4	2-3	3A

[2] FUSE IN AC HOT.
1. REF DOCUMENTS: 2704-501, 502, 503; 2904-502, 503.
NOTES: UNLESS OTHERWISE SPECIFIED.

FOR REFERENCE ONLY

QTY REQ'D	DESCRIPTION	PART NO.	MATERIAL	MANUFACTURER	ITEM NO.

LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
FRAC. ±1/32 DEC. .XX ±.02 .XXX ±.010 ANGLES ±1/2°
MATERIAL:
FINISH:
DO NOT SCALE DWG.

SIGNATURES	DATES
DWN. GERHARD	8/13/82
CHK.	
ENGR.	
ENGR.	
APPR.	

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XENTEK INCORPORATED
San Marcos, California

TITLE: POWER SUPPLY SCHEMATIC
(INTEL)

CODE IDENT 53279 | SIZE D | DWG. NO. 6005-501 143769 | REV. A

SCALE: NONE | WEIGHT: — | SHEET 1 OF 1

Figure 3-6. Model 6005 Power Supply Assembly Drawing

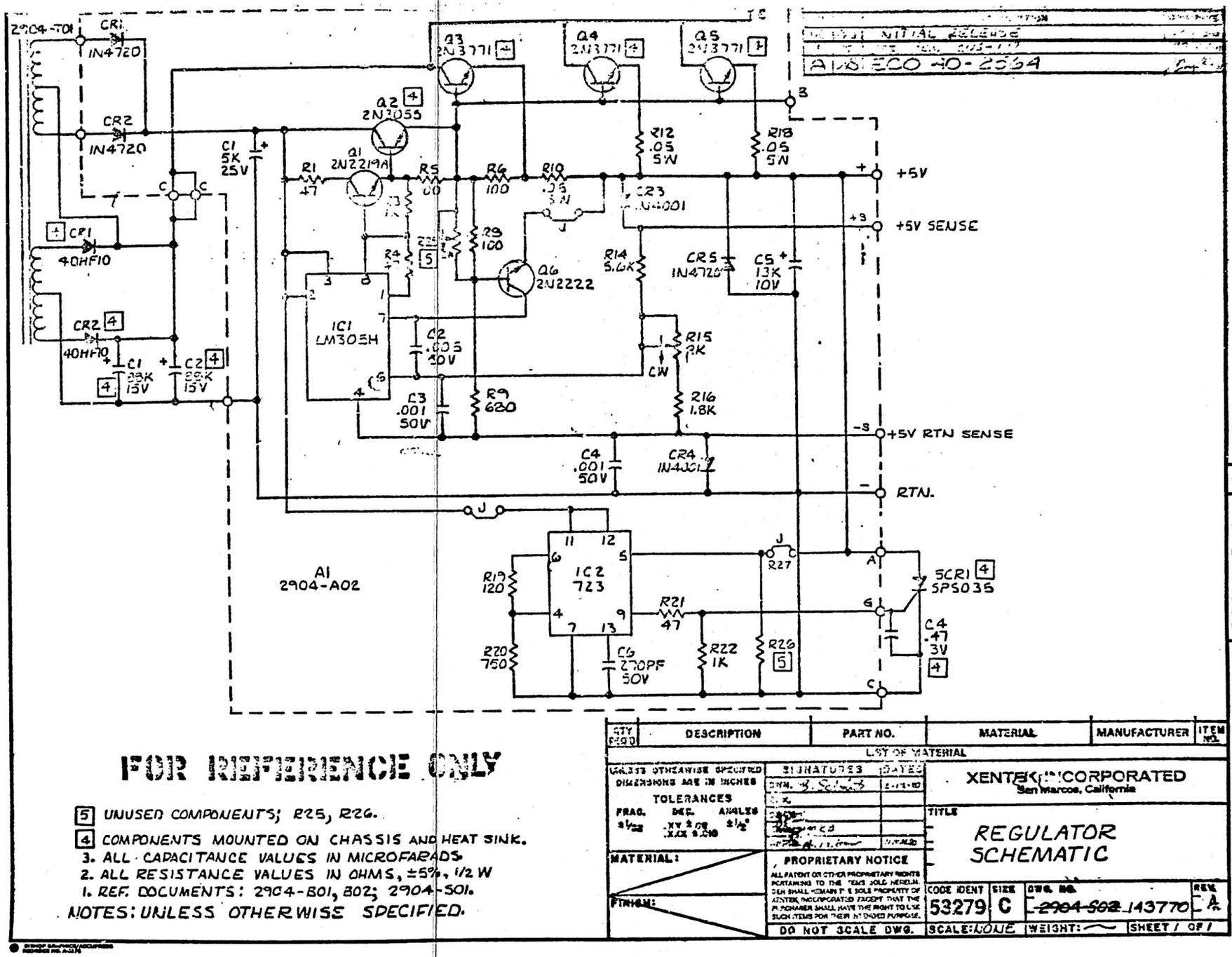

Figure 3-7. Model 6005, Schematic for Board A1

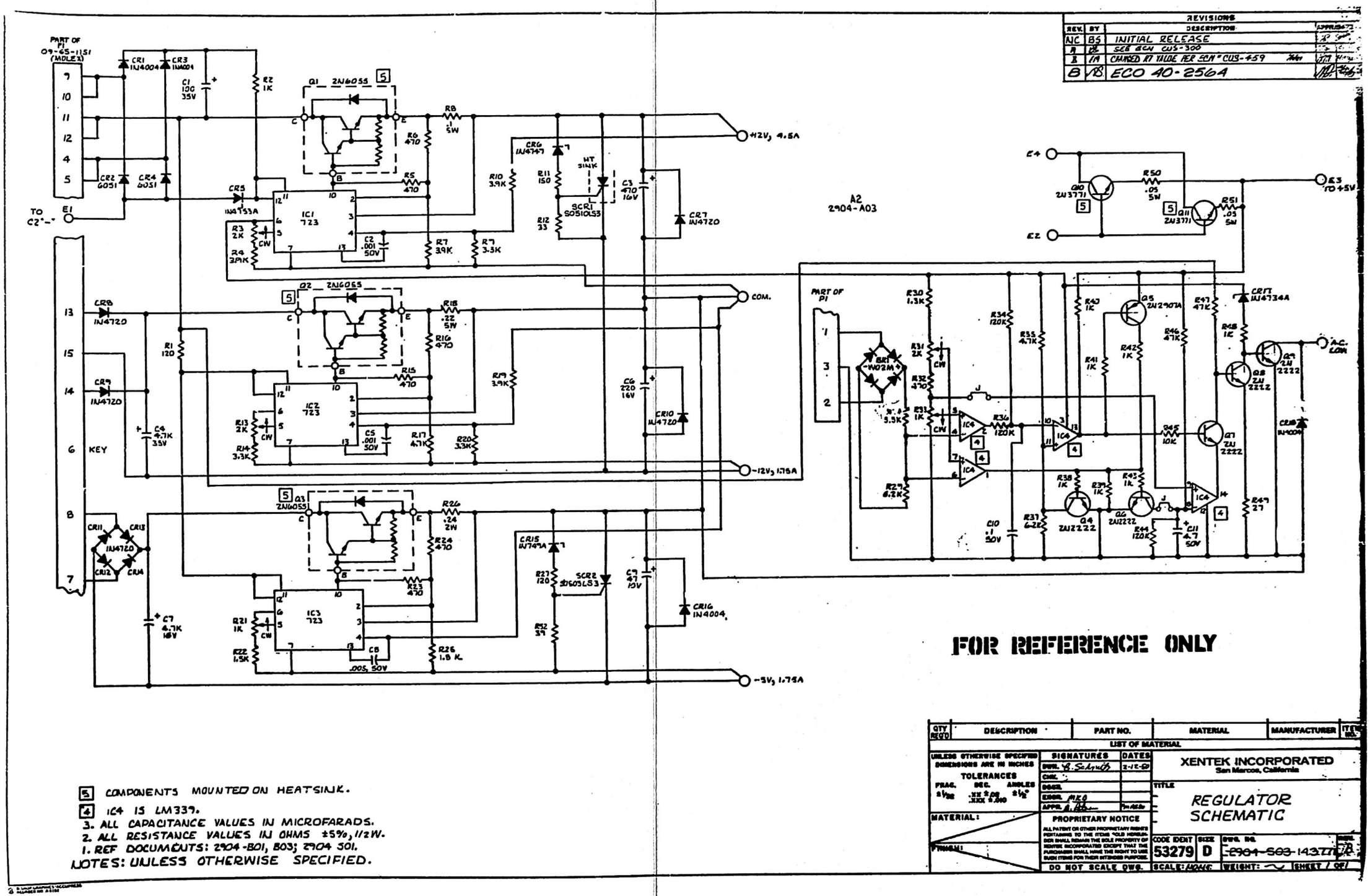

Figure 3-8. Model 6005, Schematic for Board A2

POWER SUPPLY

ITEM	PART NUMBER	QTY	DESCRIPTION	REF DES	MFR/PART NO.
1		REF	ASSY POWER SUPPLY		6005-A01
2		REF	WIRE LIST		6005-W01
3		REF	SCHEMATIC		6005-S01
4		REF	SCHEMATIC		2904-S02
5		REF	SCHEMATIC		2904-S03
6		1	HARNESS ASSY		6005-A02
7		1	REG. ASSY +5V	A1	2904-A02
8		1	REG & LINE FAIL DETECTION ASSY ±12V,-5V	A2	2904-A03
10		1	CHASSIS		6005-M01
A11		1	HEATSINK, MODIFIED		6005-M03
12		1	HEATSINK		2919-M03
13		3	CAP. CLAMP 2"-2LEG		1785-03
14		2	MTG BLOCK		2773-M04
15		1	TRANSFORMER	T1	6005-T01
17		2	CAP 88Kuf, 15V (CG)	C1,2	CGS883U015V5C3PH/MALLORY
18		1	CAP 15Kuf, 25V (CG)	C3	CGS153U025V2L3PH/MALLORY
20		1	BRIDGENK, MODIFIED	BR1	MDA 3500/MOTOROLA
21		1	BRACKET, DIODE		2032-M02
22		5	TRANSISTOR	A1Q3,A1Q4, A1Q5,A2Q10, A2Q12	2N3771
24		1	TRANSISTOR	A1Q2	2N3055
25		3	TRANSISTOR	A2Q1,A2Q2, A2Q3	2N6055
27		1	SCR	SCR1	SPS035
28		1	LUG, SOLDER 1/4"		

REGULATOR ASSEMBLY

ITEM	PART NUMBER	QTY	DESCRIPTION	REF DES	MFR/PART NO.
1		REF	REGULATOR ASSEMBLY		2904-A02
3		REF	SCHEMATIC		2904-S02
4		REF	P.W. BD. MASTER		2919-P01
5		REF	P.W. BD. SILKSCREEN		2919-P02
7		1	P.W. BOARD		2919-D01
8		1	CAP .47UF 3V DISC	C7	UK-474/CENTRALAB
9		1	CAP 4.7Kuf,25V (AXIAL)	C1	25ELA 4700/NICHICON
10		1	CAP .005uf, 50V (DISC)	C2	502GCR050Z ILLINOIS
11		1	CAP .001uf, 50V (DISC)	C3	H5 OSUZ 5U102Z PACE
12		1	CAP 13Kuf, 10V (AXIAL)	C5	TCW 133TOION 2L3P
13		1	CAP 270pf, 50V (DISC)	C6	271BCR050-K/ILLINOIS
14		1	CAP 10uf, 16V (RA)	C4	16ULAIO NICHICON
15		3	DIODE	CR1,2,5	IN4720
16		2	DIODE	CR3,4	IN4004
18		3	RES 47 5% 1/2W	R1,4,21	
19		2	RES 1K 5% 1/2W	R3,22	
20		3	RES 100 5% 1/2W	R5,6,8	
21		1	RES 680 5% 1/2W	R9	
22		3	RES WW .05% 5W	R10,12,18	HAMILTON-HALL
23		1	RES 5.6K 5% 1/2W	R14	
24		1	RES 1.8 5% 1/2W	R16	
25		1	RES 120 5% 1/2W	R19	
26		1	RES 750 5% 1/2W	R20	
29		1	POTENTIOMETER 2K	R15	3006P-1-202
31		1	TRANSISTOR	Q1	2N2219A
32		1	TRANSISTOR	Q6	2N2222
34		1	INT. CIRCUIT	IC1	LM305H
35		1	INT. CIRCUIT	IC2	723CN'
37		2	JUMPER .600 X .025	R27,R24	JO .600 x .025B22
38		1	JUMPER .300 X .025	NEAR 1C2	JO .300 x .025B22
39		1	WIRE, BLK, 20GA, 6"LG	Q4 'B'	
40		1	WIRE, BRN, 20GA, 4"LG	SCR1'G'	
41		1	WIRE, BLK, 14GA, 4"LG	SCR1'C'	
42		1	WIRE, WHT, 14GA, 4"LG	SCR1'A'	
40		1	WIRE, BRN, 20GA, 4"LG	SCR1'G'	

WIRE HARNESS ASSY

ITEM	PART NUMBER	QTY	DESCRIPTION	REF DES	MFR/PART NO.
1		REF	WIRE HARNESS ASSY		2904-A04
2		REF	WIRE LIST		2904-W01
3		REF	SCHEMATIC DIAGRAM		2904-S01
5		4	CONDUCTOR, FEMALE	P6L, P6U, P8L, P8U	26-03-3071
7		33	PIN, FEMALE	P6L, P6U, P8L, P8U	J1
9		4	KEY, POLARIZING	(P6L,P6U, P8L, P8U)	15-04-9209
11		1	CONNECTOR	J1	09-50-3151
13		1	KEY, POLARIZING	(J1)	15-04-0219
15		1	CONNECTOR	P2	03-09-2042
17		4	CONTACT, MALE	P2	02-09-2116

Model 6005 Power Supply Parts List.

INTEL CORPORATION, 3065 Bowers Avenue, Santa Clara, California 95051 (408) **987-8080**

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